Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the matter of	)	
	)	
Improving Public Safety Communications	)	
in the 800 MHz Band	)	
	)	WT Docket No. 02-55
Consolidating the 900 MHz Industrial/	)	
Land Transportation and Business	)	
Pool Channels	)	
	)	
	)	

To: Chief, Wireless Telecommunications Bureau

COMMENTS OF AMEREN CORPORATION

Ameren Corporation hereby submits its comments in the matter of Improving Public Safety Communications in the 800 MHz Band (WT Docket No. 02-55).

Background

Ameren Corporation is the parent of Union Electric Company, now known as AmerenUE, based in St. Louis, Mo., and Central Illinois Public Service Company, now known as AmerenCIPS. Ameren employees, totaling approximately 7,400, provide energy services to 1.5 million electric and 300,000 natural gas customers over 44,500 square miles in Illinois and Missouri. Among the nation's top utility companies in size and sales, Ameren includes as its subsidiaries, in addition to AmerenUE and AmerenCIPS, an energy marketing and trading affiliate — AmerenEnergy; a metering services company; CIPSCO Investment Company, which manages non-utility investments, including leveraged leases, marketable securities and energy projects; AmerenEnergy Resources, the holding company for the generating and marketing companies – AmerenEnergy Generating and AmerenEnergy Marketing; and Ameren Services, which provides support services to the corporation and its subsidiaries.

Founded in 1902, AmerenUE is Missouri's largest electric utility. AmerenUE provides energy services to customers across the eastern half of Missouri, including the greater St. Louis area, and in southwestern Illinois. While the number of AmerenUE customers has increased by 9% since 1987, the company has been able to reduce employee count by more than 20% through aggressive use of land mobile radio facilities. Central Illinois Public Service Company — known as AmerenCIPS — provides electric and natural gas

services in 66 counties throughout a 20,000-square-mile area of central and southern Illinois. A supplier of electric energy since 1902, AmerenCIPS today serves more than 323,000 retail electricity customers in 557 communities.

With a total of 14 base-load and hydroelectric plants, Ameren companies' net generating capacity is nearly 11,400 megawatts (MW), including Ameren's 60% share of the Electric Energy, Inc., Joppa, Ill., coal-fired plant.

Ameren holds FCC licenses under Union Electric, Central Illinois Public Service, Ameren Energy Generating, and Ameren Services companies.

Ameren uses an extensive 800 MHz trunked radio system consisting of 60 networked sites distributed across its service area in Missouri and five 900 MHz trunked radio sites at its power generation stations in Illinois for communications supporting customer electrical and gas service, as well as internal generating station operations. These radio systems are a critical tool for providing safe and reliable electrical and gas service to Ameren customers.

Ameren is a member of the United Telecom Council (UTC).

Discussion

Ameren believes that the problems in the 800 MHz band are the result of mixing incompatible communications systems in interleaved public safety/business/industrial 800 MHz spectrum allocation. Therefore, we feel that the best approach to solving the current problem is a technical solution. We further feel that only if these technical changes do not mitigate the interference problems should reorganizing the 800 MHz band be undertaken.

When the 800 MHz band plan was developed by the FCC in 1974, it was configured for analog services. All of the regulatory and technical specifications (transmitter emission masks, receiver filter response, and site separations), were designed to minimize interference between analog signals. In addition, the much of the radio specification data in FCC Part 90 was developed in the 1970's for tuned, tube type amplifiers which are inherently relatively spectrally pure. In this environment, the FCC Emissions mask that required a minimum of 80 dB of attenuation of the transmitted signal at the edge of the designated channel was generally adequate to minimize or eliminate interference from properly operating transmitters on adjacent channel assignments.

According to the "Best Practices Guide", transmitter sideband noise is a significant contributing factor to interference on adjacent and higher channel assignments and that, "In order to allow adequate modulation of the transmitter, the "FCC Mask" provides

limited attenuation of the transmitter sideband noise on the next, second, and third adjacent channels from the assigned channel (see 47 CFR 90.235(b))" [1].

The "Best Practices Guide" continues with, "Sideband noise interference becomes predominant only when the desired signal is weak and no intermodulation products fall on or near the desired frequency. In other words, if there were no intermodulation interference, then transmitter sideband noise will most likely be the root cause of an interference problem. Sideband noise is an increasingly frequent factor for commercial/public safety interference as additional low power commercial stations are geographically deployed to meet customer demand for coverage and system capacity. In addition, the sideband noise performance of commercial transmitters often assumes that the commercial operator will be adjacent to its own operations in the spectrum, and, therefore, will be able to manage internally its own sideband noise. The sideband characteristics of digital modulation technologies increasingly used in commercial systems contribute to this type of interference."[2]

With the transition to un-tuned, broadband transistor amplifiers and, more recently, the introduction of digital modulation schemes with their higher modulation densities, the current specifications are inadequate to prevent radiated interference by transmitter sideband noise on adjacent and even greater (up to five channels from the assigned) channels. This, coupled with placing analog and digital on adjacent channel assignments in communications systems using ten and twenty, or more, transmitters at a single site significantly raises the noise floor in the vicinity of the site within 250 kHz of each operating channel at the site. This means that the current specifications, with the 80 dB maximum attenuation of the current FCC emissions mask, would allow a 30 watt (45 dBm) transmitter to have approximately –35 dBm of transmitted power outside of the mask while still meeting all of the current specifications. When this level of broadband noise emission from the typical (ten to twenty transmitter) multi-transmitter site is considered, the noise floor in the vicinity of the site rapidly increases to well above –100 dBm across the entire block of spectrum occupied by the transmitters at the site. This results, not only in severely degraded performance for users of the site, but all users of channel allocations within three to five adjacent channels of the transmitters operating at the site. In fact, large numbers of properly operating transmitters at a single site can raise the noise floor to the point where the site is no longer accessible to its users.

As operators of a state-wide, multi-site 800 MHz, EDACS trunked radio system, we have seen the results of these previously mentioned factors. Our sites have experienced operating degradation due to slowly increasing noise floors in their vicinity (in some cases to approximately –90 dBm). If these noise floors continue to increase, we will have to file license requests to construct new sites surrounding the original site in order to restore coverage and service to our users. In effect, we would begin converting from a "Noise Limited" system to an "Interference Limited" system. This would require

[1] AVOIDING INTERFERENCE BETWEEN PUBLIC SAFETY WIRELESS COMMUNICATIONS SYSTEMS AND COMMERCIAL WIRELESS COMMUNICATIONS SYSTEMS AT 800 MHz – A BEST PRCCTICES GUIDE, Version 1, December 2000
[2] IBID

additional frequencies and or re-use of our existing site/frequency configurations to meet the needs of our internal customers.

The noise floor increases are greatest in the areas where multiple transmitters are operating at a single site. Our experience is that, even when all transmitters are operating within FCC specifications, the more RF energy that is produced at a site, the higher the noise floor in the area of the site and that "digital" transmitters contribute more to the overall noise than "analog" transmitters.

Recommendation

Because of this, we believe that the best way to eliminate the interference problems currently being encountered is through a comprehensive "three pronged" approach to the problem.

1. Change to the technical specifications to:

   (a) Develop a new channel mask to address the higher modulation densities present in digital communications systems to reduce the allowable "out of mask" radiation limits and to specifically address the issue of broadband and transmitter sideband noise emissions affecting up to the fifth adjacent channel to the assigned channel. At the minimum, this new mask should require 100 dB attenuation of all emissions outside of the assigned channel[3].

   (b) Formulate new specifications for contributions to the local site noise floor for all transmitters, and specifically for multi-transmitter sites. These specifications should have a maximum "per transmitter" increase in the site noise floor value, as well as a specified maximum value for the site which would have to be met after any new transmitter or transmitters were placed in operation at the site.

   (c) Require that all new equipment manufactured after a set date meet these new specifications for certification.

   (d) Require that all equipment currently in use be modified to meet the new specifications within a specific time frame and that for identified interfering transmitters/sites, that these modifications for compliance be immediate.

[3] John Kuivenen, Resolving digital-analog, ESMR-SMR interference, Mobile Radio Technology, March 1998

2. Regulatory and licensing practices and procedures

   (a) Continue the historical FCC policy that the interfering licensee is responsible for eliminating interference problems or will be required to cease those operations responsible for the interference[4].

   (b) Allow existing digital communications systems to continue to operate without change if they can certify that they meet the new technical specifications and there are no reported cases of interference from their system.

   (c) Allow existing digital communications systems to modify their systems to meet the new specifications by changing equipment or adding filters, adjusting power, etc. to eliminate interference problems.

   (d) If these conditions can not be met in the Interleaved and General Category 800 MHz spectrum, the interfering licensee should be given the flexibility to relocate to frequency blocks where similar modulation schemes are in operation or that the interfering licensee relocate the system receiving the interference to equivalent spectrum. If this cannot be accomplished, the interfering licensee should be required to cease the interfering operation until corrected.

   (e) Require that new systems must meet the revised specifications in a mixed, or interleaved, environment and must not increase broadband and transmitter sideband noise in the adjacent, second adjacent, and third adjacent channels above the existing levels in order to qualify for the new site/frequency grant.

3. Review the technical specifications for all 800 MHz technologies to reduce or eliminate future broadband and transmitter sideband noise interference between similar licensees.

   (a) Review and reduce the allowable "out of mask" radiation limits for all 800 MHz users, specifically addressing the issue of broadband noise and transmitter sideband noise emissions affecting up to the fifth adjacent channel to the assigned channel. At the minimum, this new mask should require 100 dB attenuation of all emissions outside of the assigned channel[5].

Ameren believes that by eliminating the technical causes of the interference between "noise limited" and "interference limited" systems, both types of systems should be allowed to coexist. We believe that this can be accomplished with stricter technical requirements for eligible systems. In addition, we believe that the overall increase of noise in the 800 MHz spectrum should be addressed by upgrading the technical standards for analog systems as well as digital systems operating in the 800 MHz band.

[4] Resolving digital-analog, ESMR-SMR interference, Mobile Radio Technology, March 1998
[5] IBID

In the matter of Consolidating the 900 MHz Industrial/Land Transportation and Business Pool Channels, Ameren Corporation hereby submits that it has no objection the consolidation of the 900 MHz Industrial/Land Transportation and Business Pool Channels as proposed in WT Docket No. 02-55.

In view of the foregoing, Ameren Corporation urges the FCC to consider these comments when ruling in the matter of Improving Public Safety Communications in the 800 MHz Band and Consolidating the 900 MHz Industrial/Land Transportation and Business Pool Channels (WT Docket No. 02-55).

Respectfully submitted

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